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(54) **TRACKING POSITION OF DEVICE INSIDE-OUT FOR AUGMENTED REALITY INTERACTIVITY**

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(57) **ABSTRACT**

Methods, systems, and computer programs are provided for generating an interactive space. One method includes identifying a reference point in a three-dimensional (3D) space using a portable device. The reference point is calibrated to an origin point of the portable device. The method includes determining by the device a position and an orientation of the portable device at the origin point. The position and orientation is determined using data from an inertial sensor of the portable device and data from the camera. The method includes generating by the portable device an augmented reality (AR) space using the reference point. The AR space includes virtual objects imposed over or in the 3D space.